Radio Engineering, Vol. 23, No. 3, 1968

Information Theory Analysis of Telepathic Communication Experiments

I. M. KOGAN

Telepathic communication experiments carried out in 1966-67 by the bio-information section of the Moscow Board of the Popov Society are described and analyzed. Some general conclusions are put forward.

In the two years of the existence of the bioinformation section, the large number of observations attributable to telepathic effects reported in the world literature has been augmented by a series of original experiments organized by E.K. Naumov, Yu. I. Kamenskiy and the author. Interest in the analysis of our results derives both from the specific methodology of the experiments and the fairly wide choice of experimental conditions.

On the assumption that the effects observed were due to the transmission of information via so far uncharted telepathic channels, it is appropriate that the results obtained should be analyzed in the framework of information theory. Such an analysis of various experiments carried out under markedly different conditions would be useful with a view to establishing regular features, common to them all, lending further confirmation of the physical reality of the effects observed, and providing a basis for further investigations.

According to their characteristics, procedure, and conditions, the experiments may be subdivided into the following groups (excluding experiments under hypnosis, some of which were described in [1]):

1. short-distance telepathic suggestion of an action with objects: 2) short-distance telepathic suggestion of the mental picture of an object with selection of the object specified; 3) long-distance telepathic suggestion of mental pictures of objects; 4) long-distance telepathic transmission of mental pictures of objects.

Typical experiments in each group and the results obtained are described below; results and their characteristics are assessed from the point of view of information theory (on the assumption of equi-probability of the specified selections and actions).

1. Short-distance telepathic suggestion of an action with objects [1]. The experiment (official record of February 7, 1966 signed by Kogan and Naumov) consisted in transmitting a mental order to take one among ten ($N = 10$) numbered cards, lying along the perimeter of a room. The distance between the "inductor" (suggestor) E.K. Naumov and the "percipient" (receptor) K.N. Nikolayev, who were in different rooms, was 3-5 m. Half of the 26 orders were correctly executed (the probability of obtaining such a result at random is of the order of 10^{-3}-10^{-6}). The time taken to execute an order was $T \approx 1$ min (measured from the tape recording of the experiment). The quantity of information required to accomplish the task was $I = \log_2 N \approx 3.3$ bit. The mean information-transmission and reception rate was $R = I/T \approx 0.05$ bit/sec. According to subjective impressions of observers the receptor perceived mental orders of the direction in which the object specified was to be found.

2. Short-distance telepathic suggestion of the mental picture of objects with selection of the object specified. The experiment consisted in selecting one of five arbitrary objects initially unknown to the receptor. Only one of the objects was shown to the inductor, whose image he mentally suggested to the receptor. In most experiments of this type the inductor was Yu. I. Kamenskiy and the receptor K.N. Nikolayev. The inductor sat behind the receptor at a distance of 4-5 m. The percent of positive outcomes was approximately 80. The duration of the suggestion was $T \approx 3$ min (according to the official records of a public experiment carried out on March 21, 1967).

It will be assumed that the entropy associated with defining the object specified is determined by the a priori assortment of objects, and that it is selected according to a set of typical attributes. Experience of numerous experiments (using the official records of two experiments at short distances of December 20, 1966 and March 21, 1967 and of experiments at large distances) showed that in practice the assortment of possible objects will contain approximately ten designations ($N \approx 10$) and that their description reduces to approximately twenty main attributes (color, shape, surface nature, hardness, etc.) ($m \approx 20$); the object selected was after determining a set of approximately four attributes ($n \approx 4$) (for example, in the experiment of March 21, 1967 the selection of the object specified — Mishka candies — was preceded by the following sequences of impressions recorded by Nikolayev: "Rather long, smooth surface, brown color, cusped on two sides"). On this basis, the selection of the object specified requires obtaining a quantity of information $I = n \log_2 m \approx 17$ bit. The a priori entropy in defining the object is $H = \log_2 N \approx 3$ bit. Thus, there is redundancy of the information processed, by approximately $\Delta I \approx 14$ bit, due to the receptor not perceiving a logical concept — the name of the object —

but merely its attributes, and selecting the object specified from the information contained in its attributes. The information-processing rate R ≈ 0.1 bit/sec, and the relative redundancy $\delta = \frac{I-H}{H} \approx 5$.

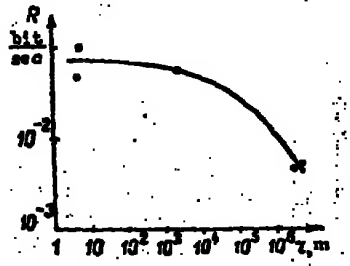
Using the expression given in [2] for the noise immunity in terms of redundancy, based on Shannon's well-known formula for the channel capacity C, assuming the channel transmission bandwidth to be W ≈ ≈ 1/T and assuming (for a rough estimate) R ≈ C, we can estimate from the above data the value of the signal-to-noise ratio P_S/P^*_N for which it is still possible to transmit the minimum required quantity of information $I_{min} = H$ under the conditions of the given experiment:

$$\frac{P_S}{P^*_N} = 2^{\frac{C}{W(1+\delta)}} - 1 = 2^{\frac{RT}{I+H}} - 1 = 2^{H} - 1,$$

whence $P_S/P^*_N \approx 5$-10, which is also in agreement with estimates of [3].

3. Long-distance telepathic suggestion of mental images of objects. The experiment was similar to that of para. 2 but with inductor and receptor in different towns. Successful experiments of this type were carried out between Moscow and Novosibirsk (the proceedings and official records were signed in Novosibirsk and Moscow by K.B. Kann, G. Beznosov, A.G. Ignatenko, Yu. I. Kamenskiy, E.K. Naumov and A.R. Arlashin) and between Leningrad and Moscow (the proceedings and official records were signed in Leningrad and Moscow by K.N. Nikolayev, K.B. Krayevskiy, O.V. Dergacheva, M.L. Gittel', I.V. Vorontsov and E.K. Naumov). Since it is not possible under such conditions to perform experiments in which the perceptor takes a specified object, and in most cases he is unable to name the object, the quantitative analysis of the results is rather approximate. Nevertheless, proceeding from the above assumptions concerning the a priori assortment of objects and their attributes, it is possible to arrive at some quantitative conclusions.

In the experiments of April 21, 1967 the inductor Yu. I. Kamenskiy transmitted to the receptor K.N. Nikolayev mental images of objects randomly selected by a commission. Of the six objects transmitted a correct description of the main typical attributes was given in three cases (e.g., when Kamenskiy transmitted a metal screw-driver with a black plastic handle, Nikolayev's reception log read "A handle or chess man. Long, black, probably plastic). [Of nine people interrogated that had no connection with the experiments, 70% of the answers correctly interpreted the reception records for 50% of the objects.] The duration of transmission was 10 minutes for each object. By similar assessments as for short-distance experiments we obtain a mean information-transmission rate of 0.005 bit/sec.



In the experiments of April 27, 1966 the inductor (A.R. Arlashin) transmitted to the receptor (K.N. Nikolayev) mental images of objects arbitrarily selected by the inductor. Of the six objects transmitted the receptor correctly described the main typical attributes of four. [The interrogation of nine people in the same way as above gave 80% correct answers for 70% of the objects.] However, some of the descriptions did not correspond to the object transmitted at the given instant but to previous ones. If it is assumed that this was the result of the inductor's subconscious attention to objects previously seen by him, one of which was selected for transmission at the given instant, the assessment yields a similar value for the information-transmission rate as that above.

In the experiments of January 27, 1967 between Moscow and Leningrad (600 km) two inductors (Yu. I. Kamenskiy and A.I. Monin) in turn transmitted to the receptor (K.N. Nikolayev) mental images of five objects randomly selected by a commission. A correct description of the main typical attributes was given for three objects. [A similar interpretation of the records by independent people gave 30% correct answers for 40-60% of the objects.] For example, when Monin transmitted a pair of dividers, with which he pricked his finger tips, Nikolayev's reception record read: "Metallic lustre, thin. Chromium-plated rod. Smooth surface. Rod bifurcated. Like thin scissors or compasses." A distinct feature of the experiments was the fact that, in contrast to all previous ones, the times of the transmissions were not prearranged, and were selected at will within a prescribed 30-minute interval. During this interval, five 4-5 min transmissions were made; the beginnings and ends of these transmissions were recorded by the receptor to within less than 1 minute. Note also that an "interceptor" (a second receptor, V.A. Milodan), who was in Leningrad during the experiments in a room on a different floor, also correctly recorded the initial and final instants of all transmissions and correctly described the attributes of two of the five objects transmitted. In the above example Milodan recorded in particular: "Cone-type object, almost equilateral triangle. It pricks the forefinger... Two sides 15-18 cm in length." The mean information-processing rate in these experiments was of the order of 0.06 bit/sec.

4. Long-distance telepathic transmission of mental images of objects. The experiment was carried out in February 1967 between Moscow and Tomsk (4000 km). The official records are signed by the inductor Yu.I. Kamenskiy and by V. Kuvshinnikov, one of the three receptors. At a prearranged

time, mental images were transmitted of one among two stipulated objects — a comb or a glass. The transmissions lasted one hour each week. In each case, seven images randomly selected by coin tossing were transmitted each for three minutes. If the predominance of either image in each series of seven selected and transmitted images is characterized by a character of the Morse code, namely a dash for the predominance of combs and a dot for the predominance of glasses, the four series transmitted during the whole month corresponded to the message -.-. The same message is obtained from Kuvshinnikov's records. Tests by several statistical criteria (the over-all frequency of coincidences, correlation coefficient, frequency of coincident Morse characters, deviation of the time plot of variations of the number of transmitted and received pictures of one and the same type, etc.) showed that by all criteria used the results exceeded the mean-statistical result of four selections, one in accord with the receptor records and three others from random numbers (Table 1).

Table 1

Criteria	Experiment	Random samples				Overall mean
		1	2	3	Mean	
Total coincidences, %	57	61	43	48	51	52
Coincidences of Morse characters, %	100	75	0	100	59	69
Correlation coefficient	+0.15	+0.22	−0.15	−0.07	+0.05	+0.04
Error in total number of images	0	21	0	0	7.2	5
RMS deviation of the time plot (arbitrary units)	18	29	72	1	34	30

In such an interpretation of the results the total transmission time of one of the two possible Morse characters was 21 min, which corresponds to an information transmission rate of 0.001 bit/sec.

Let us compare this value of the information-transmission rate with the energy relationships that would ensure information transmission under the conditions of the above experiments. We shall assume the electromagnetic hypothesis to be correct [3].

The short-distance experiments, like the earlier experiments [3], do not contradict the hypothesis of the electromagnetic nature of telepathy. To analyze long-distance experiments, earlier assessments will require some refining to allow for the waveguide nature of the propagation of extra-long waves. In this case the powers required to transmit information to a distance r will be $2h/r$ times the value assumed in [3], where h is the height of the "waveguide" determined by the height of the lower boundary of the ionosphere. If we take $h \approx 100$ km, the power improvement will be of one order at a distance of 600 km, and of two orders at a distance of 3000–4000 km. Allowing for this correction, the transmission of telepathic information observed in the Leningrad–Moscow experiments could be possible by electromagnetic means to a distance of the order of 2 km by the induction field and to a distance of the order of 500 km by the radiation field; in the latter case this is possible if it can be assumed that the intrinsic loss resistance in the inductor's "antenna" is smaller than the radiation resistance. Similar estimates for the Moscow–Novosibirsk and Moscow–Tomsk experiments give possible ranges of 10 and 500 km, respectively.

Thus, these experiments are also not incompatible with the electromagnetic hypothesis of telepathy.

An analysis of the experimental results summarized in Table 2 together with experiments considered earlier [3] enables us to put forward some quantitative and qualitative (mainly from subjective impressions) general features, apparent in experiments of various types.

1. In the experiments carried out the actual transmission rate of telepathic information was within 0.005 and 0.1 bit/sec.

2. The actually implemented information-transmission rate decreased with increasing distance, from approximately 0.1 bit/sec at a distance of a few meters to 0.06 bit/sec at 600 km, to 0.02–0.005 bit/sec at 3000 km, and to 0.001 bit/sec at 4000 km (see the figure). Thus, despite statements to the contrary, the transmission of telepathic information in our experiments was not independent of distance.

3. In the transmission of telepathic information the receptor does not apprehend logical concepts such as the names of objects (in most cases they are not formulated); as a rule the characteristics

Table 2

No.	Type of experiment	No. of experim. Total	No. of experim. Ratio of successes to total	Distance, m	Quantity of information, bit	Duration of transmission, min	Information-transmission rate, bit/sec
1	Short-distance action with objects	26	0.5	4	3.3	1	0.05
2	Short-distance suggestion of images	Many	0.8	5	17	3	0.1
3	Long-distance suggestion of images	5	0.6	$600 \cdot 10^3$	17	5	0.06
		6	0.5	$3000 \cdot 10^3$	17	60	0.005
4	Long-distance transm. of images	28	0.57	$4000 \cdot 10^3$	28	80	0.006
		4	1	$4000 \cdot 10^3$	4	80	0.001

apprehended are qualitative attributes associated with sensations (shape, color, hardness, etc.), indications as to types of actions (direction of search, etc.), and emotions. These are the most plausible code elements of transmitted telepathic information.

4. The clearest perception of telepathic information occurs during comparatively short (up to 1 min) time intervals (short message elements). Therefore, the time encoding of telepathic information must apparently proceed not by modulation of the duration of the elements transmitted but by transmission of elementary comparatively short code combinations of elements (pictures, emotions, etc.).

5. The results of the experiments carried out are not incompatible with the electromagnetic hypothesis of telepathy. This deserves further attention in connection with the recognized features of extra-long waves favoring their distant propagation [4].

Results of data processing have been confined to successful experiments. Of all the experiments organized the successful ones were approximately one half. Their analysis has been entirely and exclusively based on data of the official records signed by the participants in the experiments. [It is unfortunate that accounts of such experiments in the popular press are often based on first subjective impressions prior to the drafting of official records, not to speak of their analysis and reliability assessment.] Although the results presented are insufficient for final conclusions to be drawn, they are evidence of the advisability of further study of the problem.

REFERENCES

1. I.M. Kogan, Radiotekhnika, 1967, 22, 1.
2. I.M. Kogan, Radiotekhnika, 1967, 22, 3.
3. I.M. Kogan, Radiotekhnika, 1966, 21, 1.
4. J.A. Pierce, Trans. IEEE, 1965, AES-1, 3.

Submitted May 31, 1967

□◆◆◆□